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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/854,539	05/14/2001	Steven Towle	884.415US1	8328
21186	7590	04/18/2005	EXAMINER	
SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A. P.O. BOX 2938 MINNEAPOLIS, MN 55402			PERALTA, GINETTE	
			ART UNIT	PAPER NUMBER
			2814	

DATE MAILED: 04/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/854,539

Applicant(s)

TOWLE, STEVEN

Examiner

Ginette Peralta

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 24 January 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-17 and 25-31 is/are pending in the application.
- 4a) Of the above claim(s) 4, 6-8, 12-17 and 25-31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5, 9-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3, and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marrs et al. (U. S. Pat. 5,355,283) in view of Goldstein et al. (U. S. Pat. 5,904,955).

Regarding claim 1, Marrs et al. discloses in Fig. 5 a microelectronic device comprising a package core 502 having an opening therein; a microelectronic die 501 located within the opening of the package core 502; and an encapsulation material 503 within the opening of the package core to hold the microelectronic die within the package core 502, the encapsulation material including a polymeric resin more specifically a molding or potting resin such as epoxy (col. 8, ll. 30-35).

Marrs et al. disclosed the claimed invention with the exception of using a fiber reinforced encapsulation material.

Goldstein et al. discloses in col. 3, lines 50-61, a microelectronic device featuring a fiber reinforced encapsulation material 48 used in microelectronic device package to hold a microelectronic die within the package, the fiber reinforced encapsulation

material 48 including a polymeric resin having a fibrous filler material wherein the fiber reinforced encapsulation material is taught and used for the disclosed intended purpose of providing a molding using resin that has an improved adhesion to the structure and wherein the fiber reinforced material optimizes the overall mechanical, chemical, optical and electrical properties of the finished device as disclosed in col. 3, lines 44-50, and, furthermore, in order to preserve the integrity of the package wherein the material is chosen depending on desired characteristics such as temperature dependence, gas permeability, expansion coefficient, and others as discussed in column 1, lines 37-45 and column 3, lines 50-61.

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a fiber reinforced polymeric resin as the one taught by Goldstein et al. as the molding resin of Marrs et al. for the disclosed intended purpose of Goldstein et al. of providing a molding using resin that has an improved adhesion to the structure and wherein the fiber reinforced material optimizes the overall mechanical, chemical, optical and electrical properties of the finished device as disclosed in col. 3, lines 44-50, and, furthermore in order to preserve the integrity of the package wherein the material is chosen depending on desired characteristics such as temperature dependence, gas permeability, expansion coefficient, and others, and furthermore providing an encapsulant capable of good mechanical properties, having high heat distortion temperatures, and providing cured products exhibiting reduced shrinkage and improved surface appearance.

Regarding claims 2 and 3, Goldstein et al. does not disclose the fibers length or width, but discloses that the filler used in the fiber reinforced polymeric resin 48 can be determined by the specific technical and cost objectives that must be achieved. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to depending on the use of the fiber reinforced resin to vary the length of the particles of individual fibers, as there is no statement denoting the criticality of the fiber width and thickness and as Goldstein et al. discloses that the fibers are part of a molding used to encapsulate a semiconductor die and that the fiber reinforced polymeric resin characteristics are well known to be modifiable based on a specific design or objective.

"In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990) (The prior art taught carbon monoxide concentrations of "about 1-5%" while the claim was limited to "more than 5%." The court held that "about 1-5%" allowed for concentrations slightly above 5% thus the ranges overlapped.)" (MPEP 2144.04)

Regarding claims 9 and 10, Marrs et al. and Goldstein et al. disclose the polymeric resin including epoxy or a plastic.

Regarding claim 11, Marrs et al. discloses the structure further comprising a metallization layer 504 built up over the package core 502, the metallization layer being conductively coupled to bond pads 508 on a surface of the microelectronic die.

3. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Marrs et al. in view of Goldstein et al. as applied to claims 1-3 and 9-11 above, and further in view of Sawada et al..

Marrs et al. as modified by Goldstein et al. discloses that the fibrous filler material may be glass, ceramic or fibers, but does not specify the type of fibers used.

Sawada discloses in column 5, lines 21-28, that the fibrous filler material includes carbon-containing fibers or glass, wherein the filling material is used for the disclosed intended purpose of the disclosed intended purpose of providing a molding using resin having a smaller coefficient of thermal expansion so that a package having high mechanical strength and small thermal stress is obtained.

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a carbon fiber in the reinforced polymeric resin of Marrs et al as modified by Goldstein et al. and Sawada et al. as the molding resin of Marrs et al. for the disclosed intended purpose of Sawada and Goldstein et al. of providing a molding using resin having a smaller coefficient of thermal expansion so that a package having high mechanical strength and small thermal stress is obtained , and furthermore providing an encapsulant capable of good mechanical properties, having high heat distortion temperatures, and providing cured products exhibiting reduced shrinkage and improved surface appearance.

*Response to Arguments*

4. Applicant's arguments filed 1/24/05 have been fully considered but they are not persuasive.

Regarding applicant's argument that the obviousness conclusion on page 3 of the office action includes reference to Sawada, which was not cited in reference to claims 1-3 and 9-11, it is noted that this was a typographical error and that the passages referred to in the office action correspond to citations of Goldstein et al. and not Sawada, therefore the conclusion is not defective and is still maintained, it has been corrected in this office action and no new grounds of rejection have been introduced.

Regarding applicant's argument that Goldstein et al is concerned with adhesion problems and uses a two-phase encapsulant that could not be formed in Marrs' structure because of the complex geometry that would be needed by the two phase encapsulant, it is noted that the two phase encapsulant of Goldstein et al. is actually two separate encapsulants, one filled encapsulant material 48 and one unfilled encapsulant material 46, and it is further noted that the examiner relies on the filled encapsulant material for the teaching that the use of a fiber reinforced encapsulant material is well known to one of ordinary skill in the art and would have been obvious to use in a packaging scheme as the one taught by Marrs et al. for the disclosed intended purpose of Goldstein et al. of optimizing the overall mechanical, chemical, optical and electrical properties of the finished device as disclosed in col. 3, lines 44-50.

Regarding applicant's argument that Goldstein et al. discloses no ranges at all, and that obviousness has not been established with regards to the claimed ranges, it is noted that Goldstein teaches that the fiber size and aspect ratio can be determined by the specific technical and cost objectives that must be achieved, thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to vary the fiber size and aspect ratio, and since no showing of criticality has been introduced the rejection is maintained.

Regarding applicant's argument that Marrs does not disclose a metallization that is built up over the package core, the applicant is directed to Fig. 5 of Marrs et al. where metallization layer 504 is built over the package core.

#### *Conclusion*

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.



Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ginette Peralta whose telephone number is (571) 272-1713. The examiner can normally be reached on Monday to Friday 8:00 AM- 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

GP

*Wael Fahmy*  
*SPE 2814*